



### TO-92



#### Pin Definition:

1. Emitter
2. Collector
3. Base

### PRODUCT SUMMARY

$V_{CEO}$	400V
$V_{CBO}$	700V
$I_C$	1A
$V_{CE(SAT)}$	1.1V @ $I_C / I_B = 1A / 0.25A$

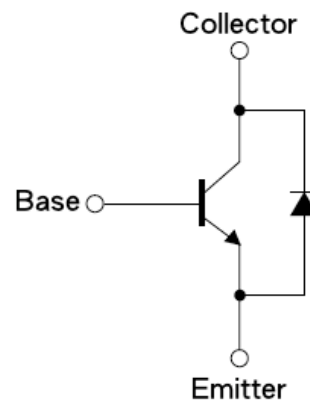
### Features

- Build-in Free-wheeling Diode Makes Efficient Anti-saturation Operation
- No Need to Interest an  $h_{fe}$  Value Because of Low Variable Storage-time Spread Even Though Corner Spirit Product.
- Low Base Drive Requirement
- Suitable for Half Bridge Light Ballast Application

### Structure

- Silicon Triple Diffused Type
- NPN Silicon Transistor with Diode

### Block Diagram



### Ordering Information

Part No.	Package	Packing
TSC5301DCT B0	TO-92	1Kpcs / Bulk
TSC5301DCT B0G	TO-92	1Kpcs / Bulk
TSC5301DCT A3	TO-92	2Kpcs / Ammo
TSC5301DCT A3G	TO-92	2Kpcs / Ammo

Note: "G" denote for Halogen free

### Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	$V_{CBO}$	700V	V
Collector-Emitter Voltage	$V_{CEO}$	400V	V
Emitter-Base Voltage	$V_{EBO}$	10	V
Collector Current	$I_C$	1	A
Collector Peak Current (tp <5ms)	$I_{CM}$	2	A
Base Current	$I_B$	0.5	A
Base Peak Current (tp <5ms)	$I_{BM}$	1	A
Total Dissipation @ Tc ≤ 25°C	$P_{tot}$	0.6	W
Maximum Operating Junction Temperature	$T_J$	+150	°C
Storage Temperature Range	$T_{STG}$	-65 to +150	°C

### Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	$R\theta_{JC}$	83.3	$^{\circ}\text{C}/\text{W}$
Junction to Ambient Thermal Resistance	$R\theta_{JA}$	200	$^{\circ}\text{C}/\text{W}$

### Electrical Specifications (Ta = 25 $^{\circ}\text{C}$ unless otherwise noted)

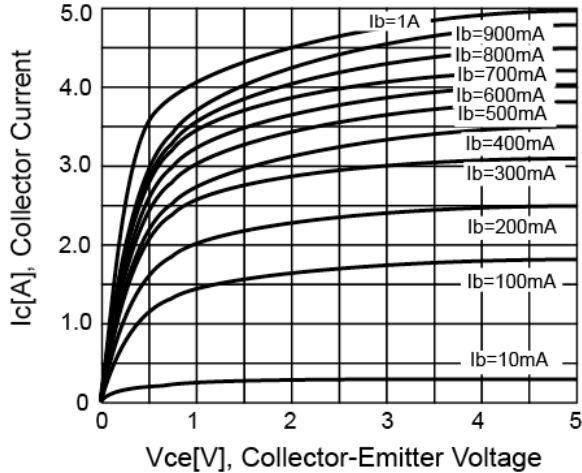
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Collector-Base Voltage	$I_C = 1\text{mA}, I_E = 0$	$BV_{CBO}$	700	--	--	V
Collector-Emitter Breakdown Voltage <sup>a</sup>	$I_C = 10\text{mA}, I_E = 0$	$BV_{CEO}$	400	--	--	V
Emitter-Base Breakdown Voltage	$I_E = 1\text{mA}, I_C = 0$	$BV_{EBO}$	10	--	--	V
Collector Cutoff Current	$V_{CB} = 700\text{V}, I_E = 0$	$I_{CBO}$	--	--	1	$\mu\text{A}$
Emitter Cutoff Current	$V_{EB} = 9\text{V}, I_C = 0$	$I_{EBO}$	--	--	1	$\mu\text{A}$
Collector-Emitter Saturation Voltage <sup>a</sup>	$I_C = 0.5\text{A}, I_B = 0.1\text{A}$	$V_{CE(SAT)1}$	--	--	0.5	V
	$I_C = 1\text{A}, I_B = 0.25\text{A}$	$V_{CE(SAT)2}$	--	1.1	1.5	
Base-Emitter Saturation Voltage <sup>a</sup>	$I_C = 0.5\text{A}, I_B = 0.1\text{A}$	$V_{BE(SAT)1}$	--	--	1.1	V
	$I_C = 1\text{A}, I_B = 0.25\text{A}$	$V_{BE(SAT)2}$	--	--	1.2	
DC Current Gain	$V_{CE} = 5\text{V}, I_C = 10\text{mA}$	$h_{FE 1}$	10	--	--	
	$V_{CE} = 5\text{V}, I_C = 400\text{mA}$	$h_{FE 2}$	10	--	30	
	$V_{CE} = 5\text{V}, I_C = 1\text{A}$	$h_{FE 3}$	5	--	--	
Turn On Time	$V_{CC} = 250\text{V}, I_C = 1\text{A}$ ,	$t_{ON}$	--	0.5	0.7	$\mu\text{s}$
Storage Time	$I_{B1} = I_{B2} = 0.2\text{A}, t_p = 25\mu\text{s}$	$t_{STG}$	--	0.5	0.9	$\mu\text{s}$
Fall Time	Duty Cycle < 1%	$t_f$	--	0.2	0.4	$\mu\text{s}$
<b>Diode</b>						
Fall Time	$I_C = 1\text{A}$	$t_F$	--	--	800	$\mu\text{s}$
Forward Voltage Drop	$I_C = 1\text{A}$	$V_f$	--	--	1.4	V

Notes:

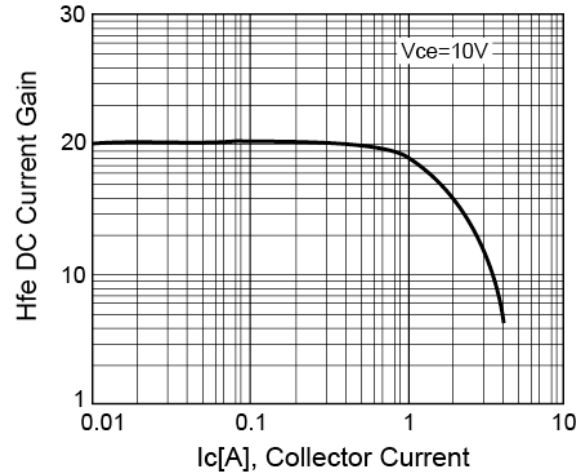
a. Pulsed duration = 300 $\mu\text{s}$ , duty cycle  $\leq 2\%$

**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

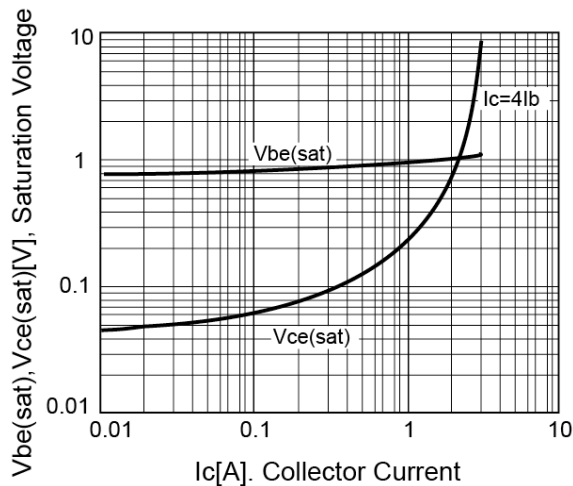
**Figure 1. Static Characteristics**



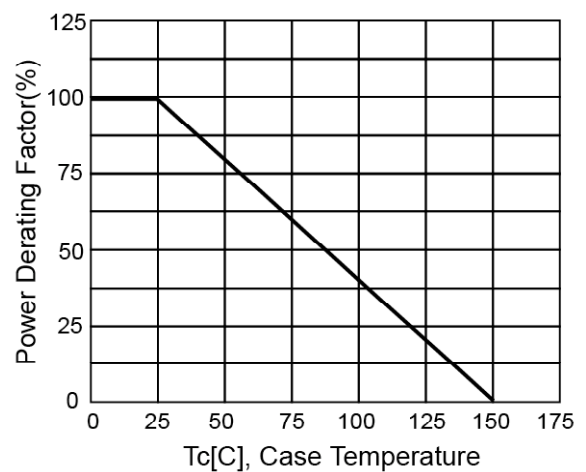
**Figure 2. DC Current Gain**



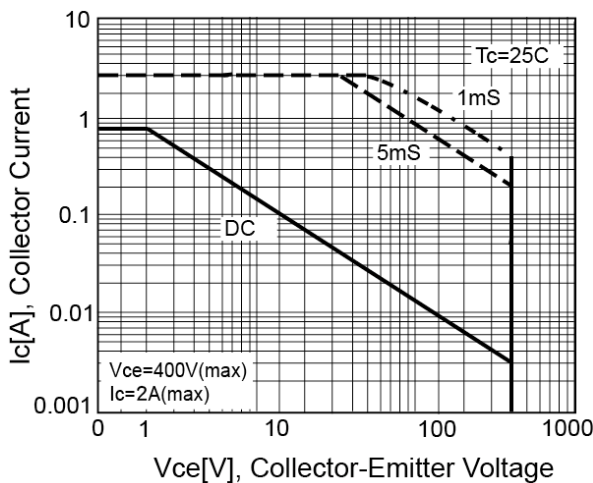
**Figure 3. Vce(sat) v.s. Vbe(sat)**



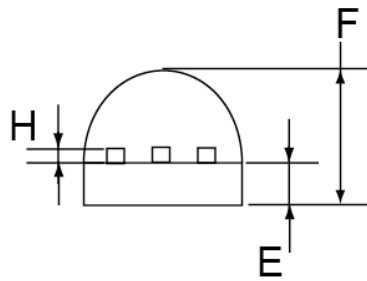
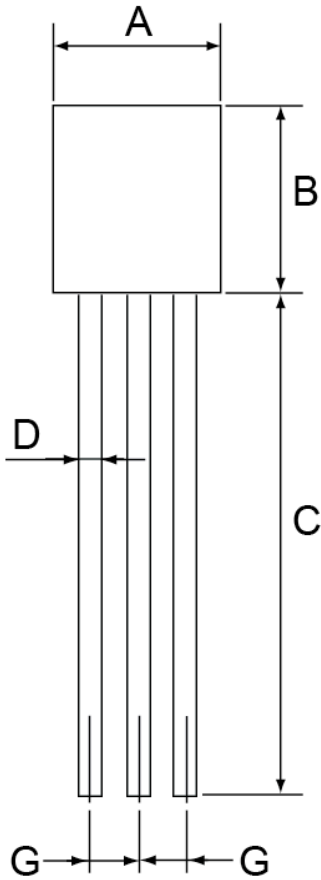
**Figure 4. Power Derating**



**Figure 5. Safety Operating Area**

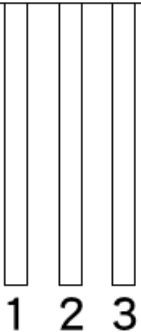
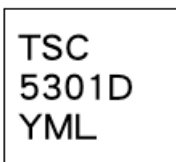


### TO-92 Mechanical Drawing



TO-92 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
B	4.30	4.70	0.169	0.185
C	13.53 (typ)		0.532 (typ)	
D	0.39	0.49	0.015	0.019
E	1.18	1.28	0.046	0.050
F	3.30	3.70	0.130	0.146
G	1.27	1.31	0.050	0.051
H	0.33	0.43	0.013	0.017

### Marking Diagram



- Y** = Year Code
- M** = Month Code  
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apr, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
- L** = Lot Code

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